

**SET OF MOTOR-DRIVEN INSTRUMENTS TO AID THE FIXING OF
DENTAL IMPLANTS**

DESCRIPTION

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The invention relates to a set of motor-driven instruments to aid the fixing of dental implants. This set forms part of the field of those sets that use atraumatic bone osteotomes consisting of a series of members with a conical apical zone and with progressive diameters, which are individually and successively introduced into the bone and then extracted using suitable manual means.

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Traditional osteotomes of the type described in the publication, "A New Approach to Surgery and Prosthesis on Implants" (Dr. Eduardo Anitua, 1996), are used in the area at the front of the upper maxillary bone in cases of bone type 3 or 4; spongy or cancellous bone. These instruments are used alternately beginning with one whose function it is to mark the start point or insertion point where an implant is to be fitted.

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The implant can then be pressed into the maxillary bone manually or tapped in with a hammer if the bone is compact in order to make the crest of the bone expand.

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With other osteotomes of a greater diameter the aim is to expand the crest until a suitable floor is created to allow an implant to be inserted, for example an implant of 3.3 mm, as suggested in WO-A-02.24102 awarded in favour of this applicant.

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Thus, and in this way an implant can be inserted using only manual osteotomes successively.

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These instruments or manual osteotomes can also be used to impact against and compact the bone in the event that the bone in the upper maxillary is cancellous (bone type 4).

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In the event that atraumatic elevation of the sinus needs to be conducted, incisions are made with the first two osteotomes down to the floor of the sinus, and then, with the remaining osteotomes, depending on the diameter of the implant to be inserted, the sinus is elevated and the bone graft material introduced into the base.

The formal characteristic of these known instruments is that they have a cylindrical or conical form similar to that of the cores of the implants used, thus providing good stability and ensuring that the implants can be inserted with excellent results.

As mentioned above this traditional technique was published by Dr. Eduardo Anitua in 1996 under the title, "A New Approach to Surgery and Prosthesis on Implants".

This known technique has the disadvantage that it cannot be used on the lower jawbone or in areas at the rear of the maxillary bone, and furthermore if the bone is very compact (types 1 and 2), tapping must be carried out with a hammer, which is very painful for patients.

ES-B- 2.127.116 relates to a set of expanders, and discloses a unit of elements that it claims prevent problems deriving from osteotomes, with this term (osteotomes) being understood as punches that are tapped on the dental base by a small hammer in an erroneous interpretation of the prior art from 1996.

The general practical disadvantage of these expanders resides in the fact that in reality they do not achieve the objectives they were designed to achieve and furthermore, in practice, the implants are not properly stabilised.

Bone-implant inconsistencies are created that derive from their specific form not being adapted to that of the final implant to be inserted; it is introduced by manual means, keys etc; and the combined use of drills is avoided.

As opposed to these techniques, it is an objective of this invention to provide a set of instruments and drills of a new design, using, alternately, new drills and new osteotomes, all of them motor-driven and which are applied with the surgical motor.

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They are, therefore, instruments that shall be used as motorised instruments, being introduced with a motor and with a known and controlled torque, and with which insertions can be performed and crests expanded in areas at the rear of the maxillary bone or in areas at the front and rear of the lower jawbone and in any type of bone.

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It is another object of this invention to provide a set of instruments that allow better directional and torque control than common techniques.

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It is another object of this invention to provide a set of instruments that allows crests to be expanded, creating a greenstick fracture in extreme cases, preventing total fracture and the loss of the vestibular plate, which is the case in ES-B- 2.127.116.

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In order to reach these objectives and with a view to their correct interpretation, five sheets of drawings are attached in which the following is represented:

- Figs. 1 to 4 show different compositions of sets of motor-driven instruments, according to the invention.

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- Fig. 5 shows an elevation in cross section of an osteotome attached to a connector connected to the surgical motor, according to the invention.

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- Fig. 6 shows an elevation in cross section of an osteotome attached to a safety connector connected to the surgical motor, according to the invention.

- Figs. 7A to 7E show a typical sequence of the way the invention is operated.

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- Fig. 8, I to X also shows different steps in the form of operating the set of instruments, on this occasion to conduct the atraumatic elevation of the maxillary sinus with inserted bone graft material.

5 Figs. 1 to 4 show that the form of embodiment according to the invention begins always with a very narrow and short quadrangular section drill (1), one end (8) of which is housed in the bone whereas its other end (6) receives a surgical motor to drive it.

10 Other drills (2, 3) of different sections can also be fitted to the surgical motor, and are alternated in combination with the osteotomes (4A, 4B, 4C and 4D) with different-sized cross sections, which are applied gradually depending on the type of bone in question.

15 The ends of the osteotomes adopt similar geometries to those of the different implants (5A, 5B, 5C, 5D), with a threaded conical end followed by another one, following after it, which is largely cylindrical, as can be seen in greater detail in figs. 5 and 6 below.

20 All the coronal ends (7) of the osteotomes are partly designed in order to receive connectors to the surgical drive motor or to a manual extractor, for example a ratchet wrench, all of which is also clearly defined in figs. 5 and 6.

25 In these units in figs. 1 to 4, the final implants are of different dimensions. Thus, the implant (5A) measures 3.3 x 15, the implant (5B) 3.75 x 15, the implant (5C) 4.5 x 15 and the implant (5D) 5 x 15.

30 In accordance with fig. 5, the osteotome can be seen with its apical end (10) from which extends the threaded conical section (9) followed by the threaded cylindrical section (8).

The coronal end (7) is capped by the polygonal projection (13) in its cross section upon which rests an O-ring seal (11) held in position by an unnumbered rivet.

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Upon the coronal end section (7) is positioned the connector (14) the end (6) of which is visible so it can be connected to the surgical motor, as is the case with the aforementioned drills. The connector comprises, on its opposite end, a blind axial recess (12) with a polygonal cross section that coincides with the section (13) of the osteotome, so that the connector fits around the osteotome.

In order to keep the connector in a stable position, the O-ring seal (11) which has been presented as not touching the inside of the connector does, in actual fact, touch it, so that when the connector fits around the section (13) of the osteotome, the seal acts as a member maintaining and retaining the assembly so that the two elements cannot be inadvertently detached while they are being handled.

In the event that it is necessary, for whatever reason, to remove an osteotome that has become stuck inside the bone in which it has been disposed, reference shall be made to the arrangement described in fig. 6 in which the connector (17) can be seen provided with a free end in which another O-ring seal (16) can be seen, disposed in proximity to the section (15) in which a hand wrench is fitted to allow the osteotome to be extracted without difficulty.

The O-ring seal (16) has the same function as the seal (11), which is to prevent the ratchet wrench from separating from the connector.

From the foregoing it can be seen how the osteotomes present a conical/cylindrical geometry with a progressive cross section, acting as wedges that gradually cause the crest to expand. Because of this progression, an excellent location is also created for the implants that have a very similar form to that given to the osteotomes.

The drills, used in combination and alternately with the osteotomes, enable the crest to be expanded, for example, in a lower maxillary or upper maxillary bone comprising very compact bone, for example, bone types 1, 2 or 3.

The use of the surgical motor allows greater control of the torque, considerably more control of the direction in addition to greatly improved control of the force to be applied.

5 Figs. 7A to 7E show a typical example of the working method with the inventive set, specifically with the set represented in fig. 1, based on the starter drill (1), the osteotome (4A), the drill (2), the osteotome (4B) and finally the implant (5A), measuring 3.3 x 15 in this proposal.

10 Representations I to X in fig. 8 show how the atraumatic elevation of the sinus is conducted, protecting the sinus or Schneiderian membrane in the process. The drills and osteotomes start cutting at a distance (19) from the base of the sinus of, for example, 1.5 mm. Then a bone graft (20) fig. 8-VI, preferably a coagulum of plasma rich in growth factors, either comprising bone
15 graft material or not, is introduced into the cavity created.

In this way, as can be deduced from figs. 8-VII to 8-IX, the process then continues with the introduction of other blunt osteotomes, with these instruments introducing the bone graft by raising the floor of the sinus (8) and
20 maintaining the integrity of the sinus membrane (21).

The process is repeated with more bone graft and finally the implant is inserted into the new cavity (18).

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CLAIMS

1. Set of motor-driven instruments to aid the fixing of dental implants, which, using atraumatic bone osteotomes consisting of a series of members with a conical apical area and progressive diameters which are individually and successively introduced into the bone and are extracted from it using suitable motor-driven means, is characterised in that,

- the osteotomes of different diameters (4A, 4B, 4C, 4D) have an apical end (10) that begins a conical section (9) followed by another cylindrical section (8), with both functional sections being threaded and the latter capped by an area (7) in which connectors are fitted (14, 17),

- a very narrow, quadrangular-section starter drill (1) shorter in length and smaller in section than the osteotomes, comprising an end for connection to a surgical motor,

- at least two drills (2, 3) of different diameters that alternate functionally between and before the osteotomes comprising ends for connection to a surgical motor,

- a connector (14) the free end of which (6) comprises a hook for a surgical motor,

- a safety connector (17) the free end of which comprises a hook (15) for connection to a ratchet wrench.

2. Set of motor-driven instruments to aid the fixing of dental implants according to claim 1, wherein the coronal end of the osteotomes comprises a polygonal projection (13), preferably hexagonal, which is capped by a cylindrical projecting section that creates a circular recess in which an O-ring seal (11) is housed.

3. Set of motor-driven instruments to aid the fixing of dental implants

according to claim 1, wherein the connectors (14, 17) present an end comprising a blind axial recess (12) with a polygonal section, preferably hexagonal, in which is housed the coronal end of the osteotomes incorporating the O-ring seal (11) that retains the connectors.

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4. Set of motor-driven instruments to aid the fixing of dental implants according to claims 1 or 3, wherein the connector (14) possesses motor functions and comprises an extension (6) for its connection to a surgical motor.

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5. Set of motor-driven instruments to aid the fixing of dental implants according to claims 1 or 3, wherein the connector (17) possesses extractor functions and comprises a free end (15) for connection to a ratchet wrench.

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6. Set of motor-driven instruments to aid the fixing of dental implants according to claim 1, wherein it comprises a set of specific drills to be used alternately with the osteotomes and thus facilitate its introduction and directional control, and also allow it to be fully expanded along its length, thereby causing greenstick fractures while preventing the cortical layer from shattering.

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ABSTRACT

Set of motor-driven instruments to aid the fixing of dental implants that combines drills (1, 2) and motor-driven osteotomes (4A, 4B, 4C, 4D) of progressive diameters. These have a conical end (9), followed by a cylindrical section and another end (7) to fit the connectors (14, 17) to the surgical motor or a manual extractor.

EXACT ENGLISH LANGUAGE TRANSLATION
 OF THE ANNEXES TO THE
 INTERNATIONAL PRELIMINARY
 EXAMINATION REPORT INCLUDING
 INCLUDING
 SPECIFICATION PAGES 1A, 1B, 2A,
 3A, 3B, 4A, 4B, 5A, 6A TO BE
 SUBSTITUTED FOR ORIGINAL
 SPECIFICATION PAGES 1-6, CLAIM
 PAGES 7A AND 8A CONTAINING CLAIMS
 1-6 TO BE SUBSTITUTED FOR ORIGINAL
 CLAIMS 1-6, ABSTRACT PAGE 9A TO BE
 SUBSTITUTED FOR ORIGINAL ABSTRACT

REPLACED BY
ART 34 AMDT

DRAWINGS

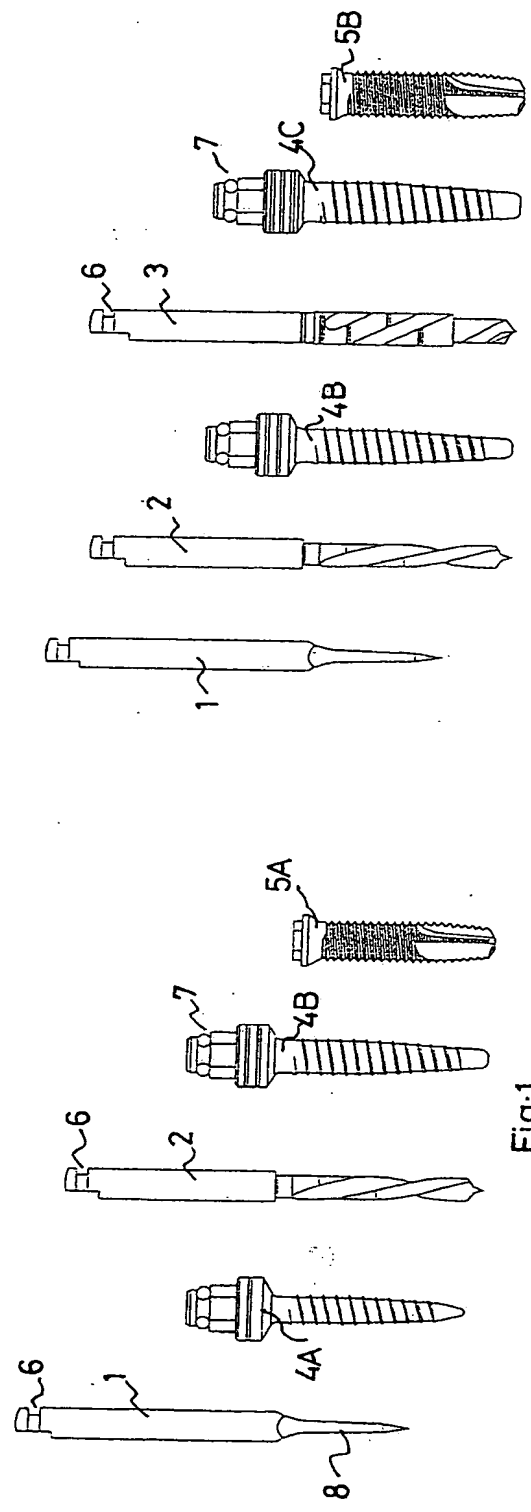


Fig:1

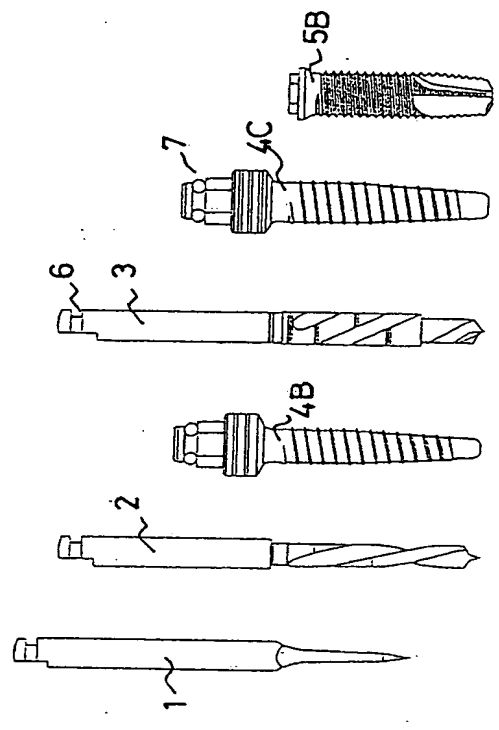


Fig:2

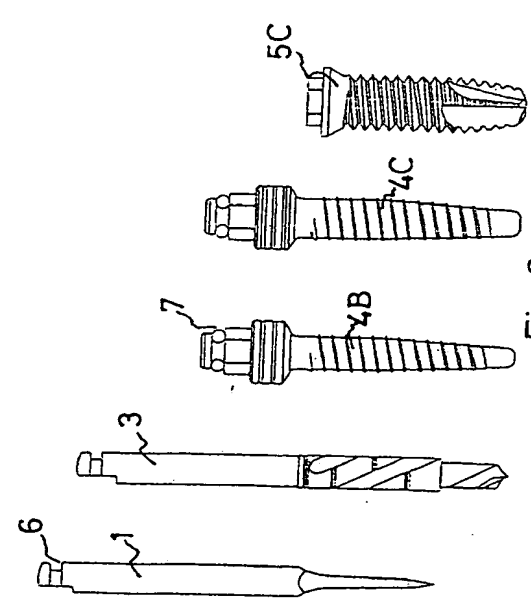


Fig:3

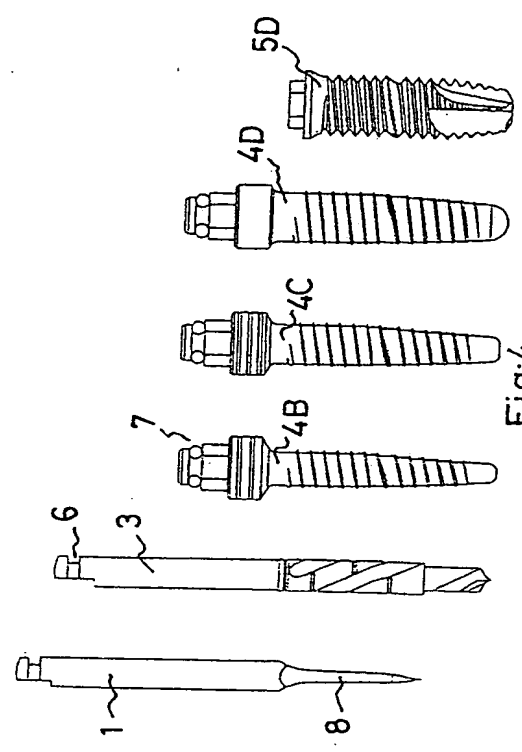


Fig:4

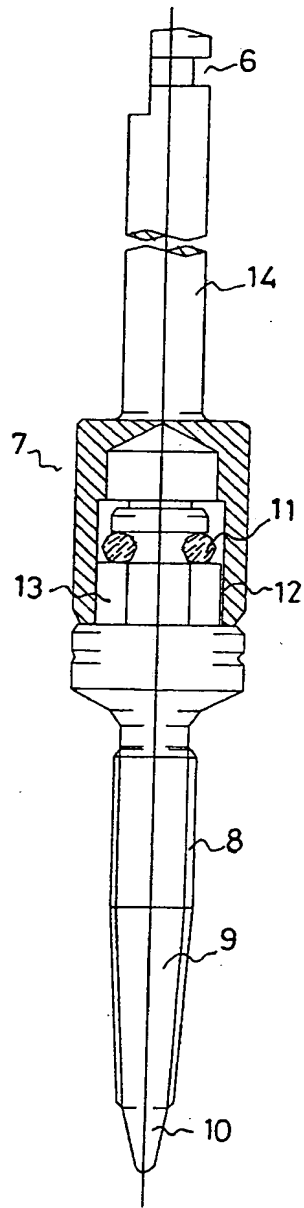


Fig:5

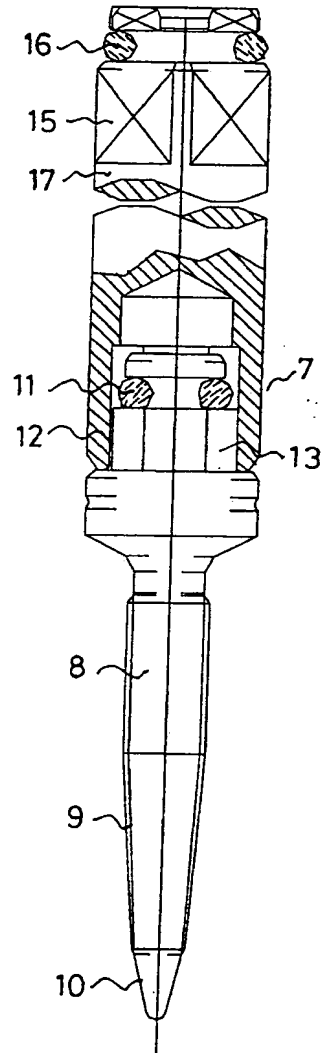


Fig:6